

CSE 4713 / 6713 — Programming Languages

Assignment 3

For programming assignment #3, your task is to write a recursive descent parser in C++. You should study the example parsers, and complete a parser that can successfully parse the provided source code files. You should print out a representation of the parse tree, as well as the symbol table.

Once your solution is complete and has been demonstrated to the Project Instructor, you need to submit the files `lexer.h`, `rules.l`, and `parser.cpp`.

Assignment 3:

Grammar Productions:

$P \rightarrow \{ \{S\} \}$

$S \rightarrow A \mid G \mid O \mid C \mid W$

$A \rightarrow \text{let } ID := E ;$

$E \rightarrow B \{ (\text{and} \mid \text{or}) B \}$

$B \rightarrow R [(< \mid > \mid ==) R]$

$R \rightarrow T \{ (+ \mid -) T \}$

$T \rightarrow F \{ (* \mid /) F \}$

$F \rightarrow [\text{not} \mid -] U$

$U \rightarrow ID \mid \text{FLOATLIT} \mid (E)$

$G \rightarrow \text{read} [\text{STRINGLIT}] ID;$

$O \rightarrow \text{print} [\text{STRINGLIT}] [ID];$

$C \rightarrow \text{if} (E) P [\text{else } P]$

$W \rightarrow \text{while} (E) P$

First Token Set:

$\{ \{ \}$

$\{ \text{let}, \text{read}, \text{print}, \text{if}, \text{while} \}$

$\{ \text{let} \}$

$\{ \text{not}, -, (, ID, \text{FLOATLIT} \}$

$\{ \text{not}, -, (, ID, \text{FLOATLIT} \}$

$\{ \text{not}, -, (, ID, \text{FLOATLIT} \}$

$\{ \text{not}, -, (, ID, \text{FLOATLIT} \}$

$\{ \text{not}, -, (, ID, \text{FLOATLIT} \}$

$\{ (, ID, \text{FLOATLIT} \}$

$\{ \text{read} \}$

$\{ \text{print} \}$

$\{ \text{if} \}$

$\{ \text{while} \}$

Error Conditions Detected:

Syntax error: display an appropriate error message and quit execution

Uninitialized Variable: display an appropriate error message and quit execution